

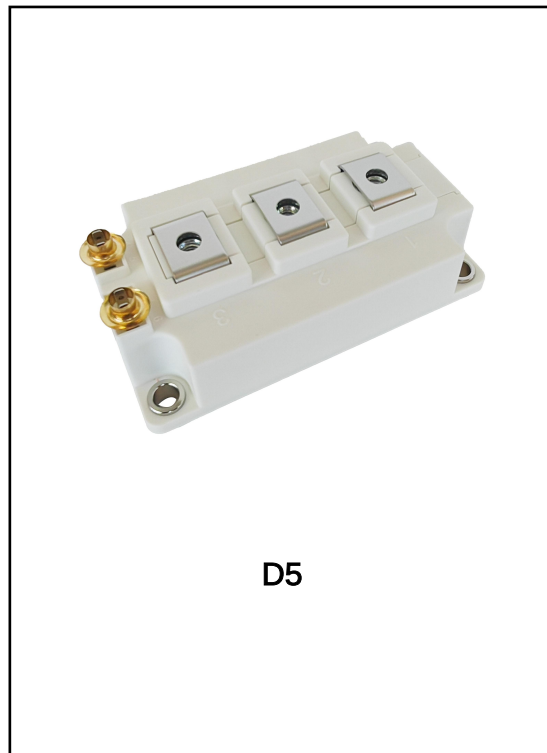
D5 PACK module with Trench/Fieldstop IGBT and Emitter Controlled diode

Features

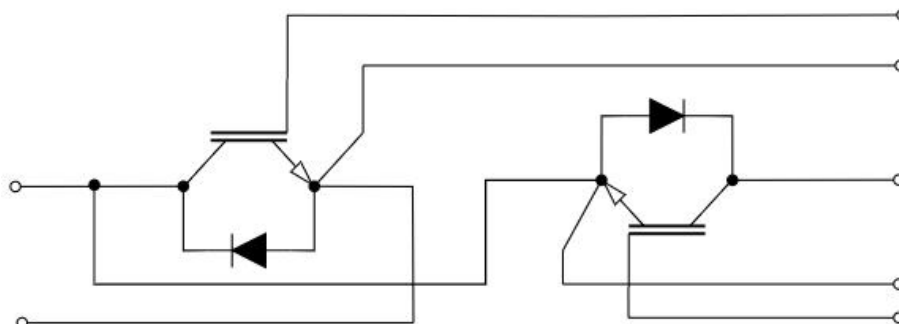
- Electrical features
 - $V_{CES} = 1200\text{ V}$
 - $I_{C\text{ nom}} = 600\text{ A} / I_{CRM} = 1200\text{ A}$
 - V_{CESat} with positive temperature coefficient
- Mechanical features
 - Standard housing
 - 4 kV AC 1 min insulation
 - High creepage and clearance distances
 - High power density
 - Isolated base plate
 - Package with CTI >500

Typical Applications

- Three-level applications
- Commercial agriculture vehicles
- High-power converters
- Motor drives
- Servo drives
- Solar applications
- UPS systems



Description



Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, $f=50\text{Hz}$, $t=60\text{s}$	4.0	kV
Internal isolation		basic insulation(class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{creep}	terminal to heatsink	29.0	mm
Creepage distance	d_{creep}	terminal to terminal	23.0	mm
Clearance	d_{clear}	terminal to heatsink	23.0	mm
Clearance	d_{clear}	terminal to terminal	11.0	mm
Comparative tracking index (electrical)	CTI		>500	
RTI Elec.	RTI	housing	140	°C

Package Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Stray Inductance	L_{sCE}			--	20	--	nH
Module Lead Resistance, Terminal to Chip	$R_{CC+EE'}$	$T_C=25^\circ\text{C}$, per switch		--	0.5	--	mΩ
Storage Temperature Range	T_{STG}			-40		125	°C
M	M	-Mounting according to valid application note	M5, Screw	3.0	--	6.0	Nm
M	M	-Mounting according to valid application note	M6, Screw	3.0	--	6.0	Nm
Weight	G			--	340	--	g

IGBT

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Description	Note or test condition		Value	Unit
V _{CES}	Collector-Emitter Voltage	T _{vj} = 25 °C		1200	V
I _{CDC}	Continuous DC collector current	T _{vj max} = 175 °C	T _C = 90 °C	600	A
I _{CRM}	Repetitive peak collector current	t _p limited by T _{vj op}		1200	A
V _{GES}	Gate-emitter peak voltage			±30	V

Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 600 A, V _{GE} = 15 V	T _{vj} = 25 °C	--	1.65	2.65	V
			T _{vj} = 150 °C	--	1.80	--	
V _{GE(TH)}	Gate-Emitter Threshold Voltage	V _{GE} = V _{CE} , I _C = 5 mA		5.5	6.0	6.5	V
I _{CES}	Collector-Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} = 1200V		--	--	2	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = ±30V, V _{CE} = 0 V		--	--	±200	nA
R _{Gint}	Internal Gate Resistance	f=1 MHz		--	0.3	--	Ω
C _{ies}	Input Capacitance	f=1 MHz, V _{CE} = 25 V, V _{GE} = 0 V		--	61	--	nF
C _{oes}	Out Capacitance			--	2.01	--	nF
C _{res}	Reverse Transfer Capacitance			--	0.42	--	nF
Q _G	Gate Charge	V _{GE} = 15 V, V _{CC} = 600 V, I _C = 600A		--	3.17	--	μC
t _{d(on)}	Turn-On Delay Time	V _{CC} = 600V, I _C = 600A,, V _{GE} = 0/15V, R _G = 3.3 Ω , Inductive Load T _{vj} = 25 °C		--	0.632	--	μS
t _r	Rise Time			--	0.324	--	μS
t _{d(off)}	Turn-off Delay Time			--	1.780	--	μS
t _f	Fall Time			--	0.248	--	μS
E _{on}	Turn-On Switching Loss per Pulse			--	77.9	--	mJ
E _{off}	Turn Off Switching Loss per Pulse			--	31.1	--	mJ
t _{d(on)}	Turn-On Delay Time	V _{CC} = 600V, I _C = 600A,, V _{GE} = 0/15V, R _G = 3.3 Ω , Inductive Load T _{vj} = 150 °C		--	TBD	--	μS
t _r	Rise Time			--	TBD	--	μS
t _{d(off)}	Turn-off Delay Time			--	TBD	--	μS
t _f	Fall Time			--	TBD	--	μS
E _{on}	Turn-On Switching Loss per Pulse			--	TBD	--	mJ
E _{off}	Turn Off Switching Loss per Pulse			--	TBD	--	mJ
I _{sc}	SC Data	V _{GE} ≤ 15 V, V _{CC} = 600 V, V _{CEmax} = V _{CES} - L _{sCE} · di/dt	t _p ≤ 10 μs, T _{vj} = 150 °C	--	2500A	--	A
R _{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		--	0.058	--	K/W
T _{vj op}	Temperature under switching conditions			-40	--	175 ¹⁾	°C

¹⁾ T_{vj op} > 150 °C is only allowed for operation at overload conditions.

Diode

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Description	Note or test condition	Value	Unit
V _{RRM}	Repetitive peak reverse voltage	T _{vj} = 25 °C	1200	V
I _F	Continuous DC forward current		600	A
I _{FRM}	Repetitive peak forward current	t _p = 1 ms	1200	A

Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Value			Unit
				Min	Typ	Max	
V _F	Diode Forward Voltage	I _F = 600 A, V _{GE} = 0 V	T _{vj} = 25 °C	--	1.25	2.25	V
			T _{vj} = 150 °C	--	1.10	--	
T _{rr}	Reverse Recovery Time	I _F =600 A, R _G =3.3 Ω T _{vj} = 25 °C		--	297	--	ns
Q _r	Recovered Charge			--	38	--	μC
I _{RM}	Peak Reverse Recovery Current			--	4.86	--	A
E _{rec}	Reverse recovery energy			--	1.80	--	mJ
T _{rr}	Reverse Recovery Time	I _F =600 A, R _G =3.3 Ω T _{vj} = 150 °C		--	TBD	--	ns
Q _r	Recovered Charge			--	TBD	--	μC
I _{RM}	Peak Reverse Recovery Current			--	TBD	--	A
E _{rec}	Reverse recovery energy			--	TBD	--	mJ
R _{thJC}	Thermal resistance, junction to case	per diode		--	0.075	--	K/W
T _{vj op}	Temperature under switching conditions			-40	--	175 ²⁾	°C

²⁾T_{vj op} > 150 °C is only allowed for operation at overload conditions.

mounting depth max. 10

10.75 ± 0.3 3X

14 ± 0.2

20

mounting depth min. 7

30.9 ± 0.5

7 ± 0.3

23 ± 0.3

29 ± 0.3

30.9

C

SIDE VIEW

